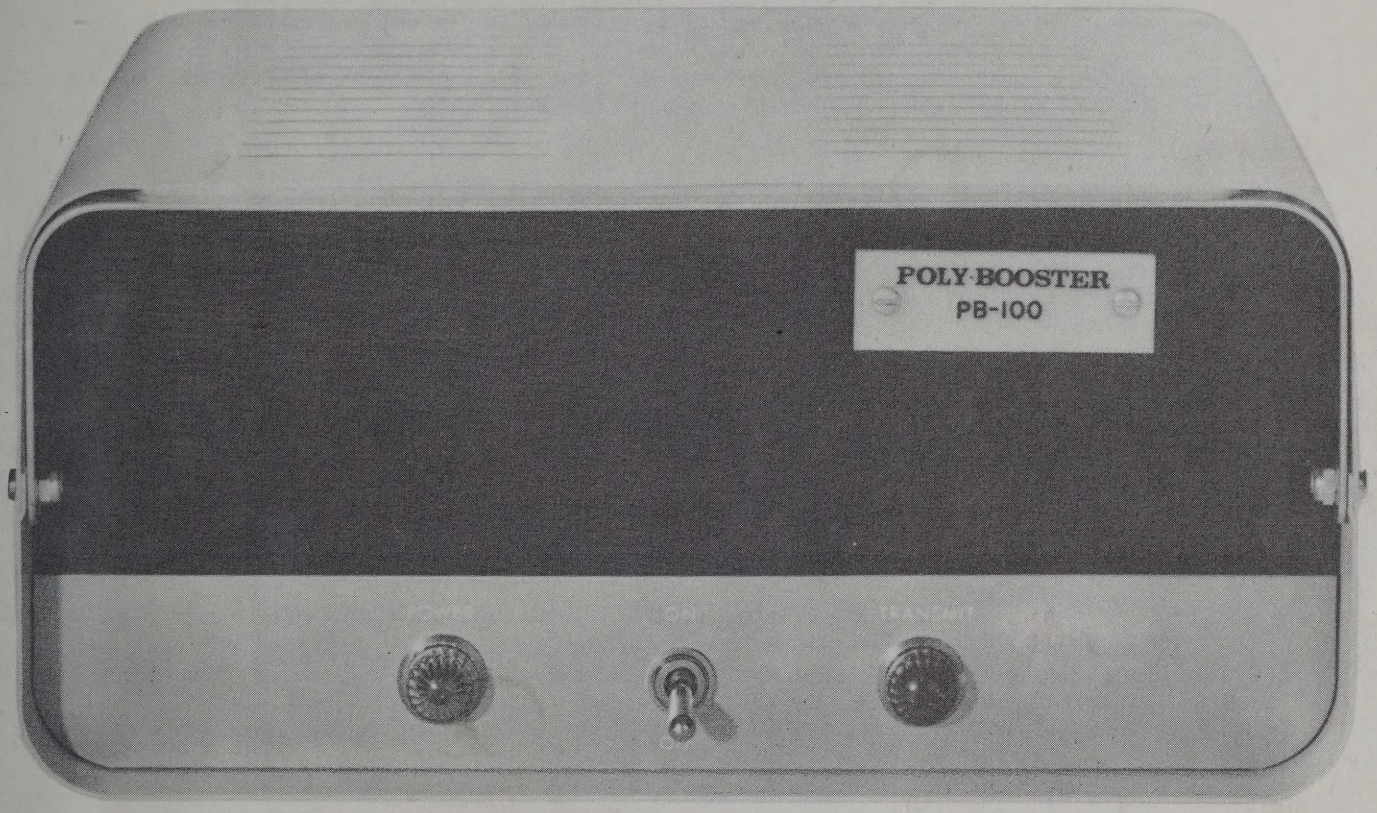
Shop Manual

INSTRUCTION MANUAL
POLY-COMM PB-100-1



FCC TYPE ACCEPTED FOR RULES PART 89

AND RULES PART 91

FREQUENCY RANGE 27.39 TO 49.90 MC.

POLYTRONICS LABORATORIES, INC.

88 CLINTON ROAD, WEST CALDWELL, NEW JERSEY 07007

Tel: (area 201) 228-2400

MANUAL NO. PB-100-1

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WARRANTY

The Company warrants the equipment to be free from defects in workmanship and material under normal and proper use and service for the uses and purposes for which it is designed, and agrees to repair or replace at the place of manufacture, without charge, all parts thereof showing such defects which are returned for inspection to the Company's factory, transportation prepaid, within a period of ninety(90) days from date of delivery, provided that such inspection discloses to the satisfaction of the Company that the defects are as claimed, and provided also, that the equipment has not been altered, repaired, subjected to misuse, negligence or accident, or damaged by lightning, excessive current or otherwise, or had its serial number or any part thereof altered, defaced, or removed. Tubes, vibrators, fuses, crystals, diodes, transistors and pilot lamps shall be deemed to be covered by the manufacturers' standard warranty applicable thereto, and such items shall be, and are, hereby excluded from the provisions of this warranty.

The Company warrants that all of the items of equipment that are of the Company's own manufacture will meet the technical specifications of the Standards of Good Engineering Practices, as established by the Federal Communications Commission. As to all items of equipment that are not manufactured by the Company, it is understood that the standard warranty of the manufacturer or supplier thereof shall be the only warranty applicable to such equipment.

Except as herein specifically provided, no warranty, expressed or implied, other than that of title, shall apply to any equipment sold hereunder. In no event shall the Company be liable for damages by reason of the failure of the equipment to function properly or for any consequential damages.

CHANGES

The Company reserves the right to modify or change the equipment, in whole or in part, at any time prior to delivery thereof, in order to include therein electric or mechanical refinements deemed appropriate by the Company, but without incurring any liability to modify or change any equipment previously delivered, or to supply new equipment in accordance with earlier specifications.

NOTE: No merchandise will be accepted for warranty service without prior written factory authorization.

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GENERAL DESCRIPTION

The Poly Comm PB-100-1 Booster has been designed to increase the power output of the Poly Comm B-1 transmitter section. It is available for use from either 117VAC or 12VDC negative ground sources.

The power output tubes are type 8032. The 8032 tube features a dark heater and is the most efficient type available for this service. In the event of loss of drive, the final tubes are protected by the keying relay.

The Poly Comm B-1 will continue to operate thru the booster should the booster fail to operate, at which time the booster power switch should be turned off to allow the full power from the "B-1" to reach the antenna, and prevent damage to the PB-100-1.

The AC power supply used in the booster is a conventional full wave voltage doubler. The DC version power supply is transistorized.

The guaranteed output of 100W is possible due to special heat sinks surrounding the 8032's, which serves to transfer the heat from the tubes directly to the case.

The Pi network output circuit is followed by a five-section harmonic filter. The output load range is 35 to 75 ohms.

The PB-100-1 booster is shipped from the factory pre-tuned to the customer's frequency. To place it in operation, follow the steps outlined in the installation instructions.

The Poly Comm PB-100-1 booster is solidly constructed. All field alignment adjustments are labeled on the rear panel. A special neutralizing adjustment is available thru an access hole in the case. All connections are made to connectors on the rear panel.

The Poly Comm Booster will increase the range of the B-1 by a radius of 10 miles in open flat terrain. This is equivalent to an increase of approximately 705 square miles of additional coverage.

SPECIFICATIONS

OPERATING RANGE	The Poly Comm PB-100-1 Booster will increase the range of the Poly-Comm B-1 transmitter by a radius of 10 miles in open flat terrain. This is equivalent to approximately 705 square miles additional coverage.
FCC FILE NUMBER	Polytronics Type PB-100-1 (Type Accepted)
FCC LISTING	Radio equipments list Part C. Viewable at FCC field offices only.
POWER INPUT TO FINAL	178 Watts.
POWER OUTPUT TO ANTENNA	At least 100 Watts.
OUTPUT IMPEDANCE	51 ohms nominal, accommodates 35 to 75 ohms resistive load.
SPURIOUS EMISSION ATTENUATION	Spurious emissions occuring within ±10 to ±20KC of the assigned carrier frequency are attenuated at least 25Db. Spurious emissions within ±20 to ±50KC are attenuated at least 35Db. Spurious emissions occuring on frequencies removed from the assigned frequency by more than ±50KC are attenuated by at least 63.0Db ($43 + 10 \log_{10} P_c$).
HUM AND NOISE	When driven by a Poly Comm B-1, at least 40Db below ±5KC deviation at 1000 cps.
DUTY CYCLE	1 minute on, 4 minutes off.
ALTITUDE	Will operate at full power output up to 10,000 feet above sea level.
HUMIDITY	Will perform after being subjected to 90°C at 95% relative humidity for 8 hours.
VIBRATION	Will withstand 10G shake from 60 to 1800 cpm for 30 minutes in three planes.
SHOCK	Will withstand 15G shock in three planes.
SUPPLY VOLTAGE VARIATIONS	-20 to +10% rated input voltage.
AC POWER CONSUMPTION	225 Watts Transmit.
DC POWER CONSUMPTION	1.7 amps at 12VDC Receive - 18.5 amps at 12VDC Trans.
SIZE	11" W x 8" D x 5" H
WEIGHT	17 lbs. A.C. - 10.5 lbs. D.C.
COLOR	White case, black and gold front panel.

TUBE COMPLEMENT

2-8032	RF Power Amplifier
Controls	FRONT PANEL: Power Switch, off-on REAR PANEL: Tuner-Operate Switch Grid Tune Capacitor Plate Tune Capacitor Load Capacitor

EQUIPMENT LIST

PB-100-1 AC Unit Check List

( ) Poly-Comm PB-100-1 AC with line cord attached.
( ) 2 each PL259 Coax Connector.
( ) 2 each UG-176/U Coax Adaptor.
(X) Instruction Manual.
( ) Jumper for Poly-Comm B-1 No. 1138.
( ) Transmitter ID Card 452C.
( ) Final Test Data Sheet.
( ) Station Record Sheet.

PB-100-1 DC Unit Check List

( ) Poly-Comm PB-100-1 DC
( ) Primary Cable and socket assembly.
( ) Fuse holder GE part No. 8411-3.
( ) 1 each 30 amp fuses (NON).
( ) 2 each PL259 Coax Connector.
( ) 2 each UG-176/U Coax Adaptor.
(X) Instruction Manual.
( ) Jumper for Poly-Comm B-1 No. 1138.
( ) 3 each screw lugs for No. 10 screw. Manufacturer - Burndy, No. LA4C.
( ) 1 each crimp-solder lug for 3/8" stud. Manufacturer - T and B, No. DB-38.
( ) Universal Mounting Bracket No. P7.
( ) 3 each knurled thumb screws 10-32 x 1/4 No. 1004A.
( ) 4 each No. 8 3/8 Hex Head self-tapping screws.
( ) 2 each No. 10 5/8" round head Phillips self-tapping screws.
( ) Final Electrical Test Data Sheet.
( ) Transmitter Identification Card 452-C.
( ) Station Record Sheet
( ) 1 each No. 10 5/8" binding head self-tapping screw.

INSTALLATION

Consult the Poly-Comm B-1 Instruction Book for B-1 installation instructions.

Most antennas used in this service appear as an open circuit to DC; however, a few types exhibit low DC resistance. Check the antenna to be used with an ohmeter. If the antenna is of a low resistance type, an isolating adaptor must be used.

The adaptor may be purhhased from any Poly-Comm dealer or may be constructed as indicated in Figure 5.

OPERATION FROM AC MAINS: The PB-100-1 AC powered booster required 105-125V 60 cycles. It may be installed at the operating position, or if desired, may be located near the antenna. RG58/U interconnecting cable may be used for lengths up to 20 feet. RG8/U may be used for lengths from 20 to 100 feet. The booster must be protected from the elements and provisions made for ventilation. (See Figures 3 and 4).

OPERATION FROM 12VDC NEGATIVE GROUND: The PB-100-1 DC booster requires a 12VDC negative ground source. The installation may be varied to suit a vehicular or fixed installation, keeping in mind that the primary power leads should be as short as possible.

When the location has been determined, mount the universal mounting bracket P7 with the No. 8 - 3/8" self-tapping screws provided. Be careful not to drill into the gas tank. Two No. 10 5/8" Phillips Head self-tapping screws are provided for mounting the fuse block. The fuse block is normally mounted in the engine compartment near the starter solenoid connection. The No. 8 primary wire, with the power socket and ground wire installed, should be routed from the booster location to the fuse block. When running this wire, keep it clear of the hot exhaust manifold, muffler, and tail pipe. Fasten it securely and protect it with tape or loom where it passes through holes, or over sharp edges. A length of garden hose may be slipped over the cable for additional protection. The No. 8 primary cable should be cut at the fuse connector and a screw lug installed. The remaining cable will be used to connect from the fuse block to the starter solenoid (battery side). Cut the cable to fit and install a screw lug on the fuse end and a larger "crimp and solder" type lug on the solenoid end.

All connections pertaining to the 12VDC primary circuit must be electrically tight. Solder the lugs in place wherever possible. Cut the ground cable to desired length and install a screw lug. Drill a .157 (No. 22 drill) or a 5/32 diameter hole and clean around the hole to bright metal. Fasten the ground lug securely with the No. 10 self-tapping screw furnished.

The cable from the antenna connector of the Poly-Comm B-1 is to connect to the input connector of the PB-100-1 booster, and a length of cable will connect from the output antenna connector of the PB-100-1 booster to the antenna. Two PL259 connectors and two UG-176/U adaptor fittings are furnished. It may be possible just to cut the antenna cable and install the fittings. If not, a new length will be required. (See Figures 2 and 4)

TUNE UP PROCEDURE

The booster has been tuned to the customer's frequency at the time of shipment, and only a recheck of the grid tuning, and loading to the station antenna will be necessary.

Install the jumper (packed with the booster) in the two pin jacks on the rear apron of the Poly-Comm B-1. Connect a wattmeter or dummy load to the antenna connector of the PB-100-1 booster. Set the tune-operate switch to tune and the power switch to on. Connect the power cord to the power source. Place the Poly-Comm B-1 front panel toggle switch in the receive-transmit position. Allow a minimum of one minute warm-up time. Connect the negative lead of a 20,000 ohm per volt vom to pin No. 8 of the test plug on the rear panel of the PB-100-1 booster. Connect the positive lead to Pin No. 3. Set vom to read +30 to 100VDC.

1. Key the transmitter with the mike switch or the keying switch (DWG No. 1141A separately available as an accessory). Adjust the grid capacitor for maximum reading. At least -60V for DC units or at least -40V for AC units -- transmitter off. (See Figure 5).

2. Leaving the vom positive lead connected to Pin No. 3 of the test socket, connect the negative lead to Pin No. 7. Key the B-1 transmitter. Alternately tune the plate and load capacitors for maximum vom reading. Change the vom scale up or down as necessary. Transmitter OFF.

3. Place the tune-operate switch in the operate position. Leave the vom connection as a step No. 2. Alternately tune the plate and load capacitors for maximum reading.

4. Leave the vom connected as in Step 2. Disconnect the wattmeter or dummy load and connect the station antenna.

   Monitor the B-1 receiver channel and pick a time when the channel is clear. Key the transmitter and once again alternately adjust the plate and load capacitors for maximum vom reading - transmitter OFF - lock the capacitor locks.

   The installation is complete.

The following adjustments are to be performed only by a person holding a valid first or second Class Radiotelephone Operators License.

ALIGNMENT

Ascertain that the proper harmonic filter and Pi network coils for the desired frequency are installed. See the chart on the schematic.

A 20,000 ohm per volt vom, a Poly-Comm B-1 tuned to the desired frequency, with a jumper installed in the pin jacks on the rear apron, and a 51 ohm wattmeter will be required to tune the PB-100-1.

Connect any length of RG58/U or RG8/U (with PL 259 connectors on both ends). From the antenna connector of the Poly-Comm B-1 to the input connector of the PB-100-1 booster. Connect the wattmeter to the antenna connector of the booster.

Preset: The booster power switch to on. The Poly-Comm B-1 front panel toggle switch to receive-transmit. The booster tune-operate switch (located on the rear panel of the booster) to tune, and the neutralizing capacitor to mid-range. Disable the keying relay by placing a thin strip of insulation between the contracts or disconnecting one side of the coil. Connect the power cord to the power source.

1. Set the vom to read in the 0 to +100VDC range. Connect the positive lead to Pin No. 3 of the test socket on the rear panel of the booster, and the negative lead to pin No. 8; key the B-1 transmitter and adjust the grid capacitor for maximum vom reading. The reading must be at least -40V for an AC booster and at least -60V for a DC booster. Transmitter OFF.

2. (Omit this step when changing frequency within the range of the original coil).

   Set the vom on the 0 to +1 MA scale. Connect the positive lead to Pin No. 3 and the negative lead to Pin No. 4 of the booster test socket. Key the B-1 transmitter. Adjust the plate and load capacitors for maximum vom reading. With an insulated tool, adjust the neutralizing capacitor a few degrees counter-clockwise. Readjust the plate capacitor for maximum vom reading. If the peak reading is less than it previously was, continue adjusting the neutralizing capacitor a few degrees at a time, counter-clockwise, and re-peaking the plate capacitor until an overall minimum reading is obtained.

   Should the vom reading tend to increase when the neutralizing capacity is rotated counter-clockwise, the neutralizing capacitor should be rotated clockwise a few degrees at a time until an overall minimum is reached.

3. Place the keying relay back in operation. Set the vom on the 0 to +25VDC scale. Connect the positive lead to No. 3 and the negative lead to No. 7 of the booster test socket. While keying the B-1 transmitter, alternately adjust the plate and load capacitors for maximum reading. Turn the transmitter off, switch the tune operate switch to operate, and readjust the plate and load capacitors for maximum reading. The wattmeter should indicate at least 100 watts. Tighten the capacitor locks.

This completes the alignment. The plate and load capacitors will require tuning when the booster is connected to an antenna. The procedure is covered in the installation instructions.

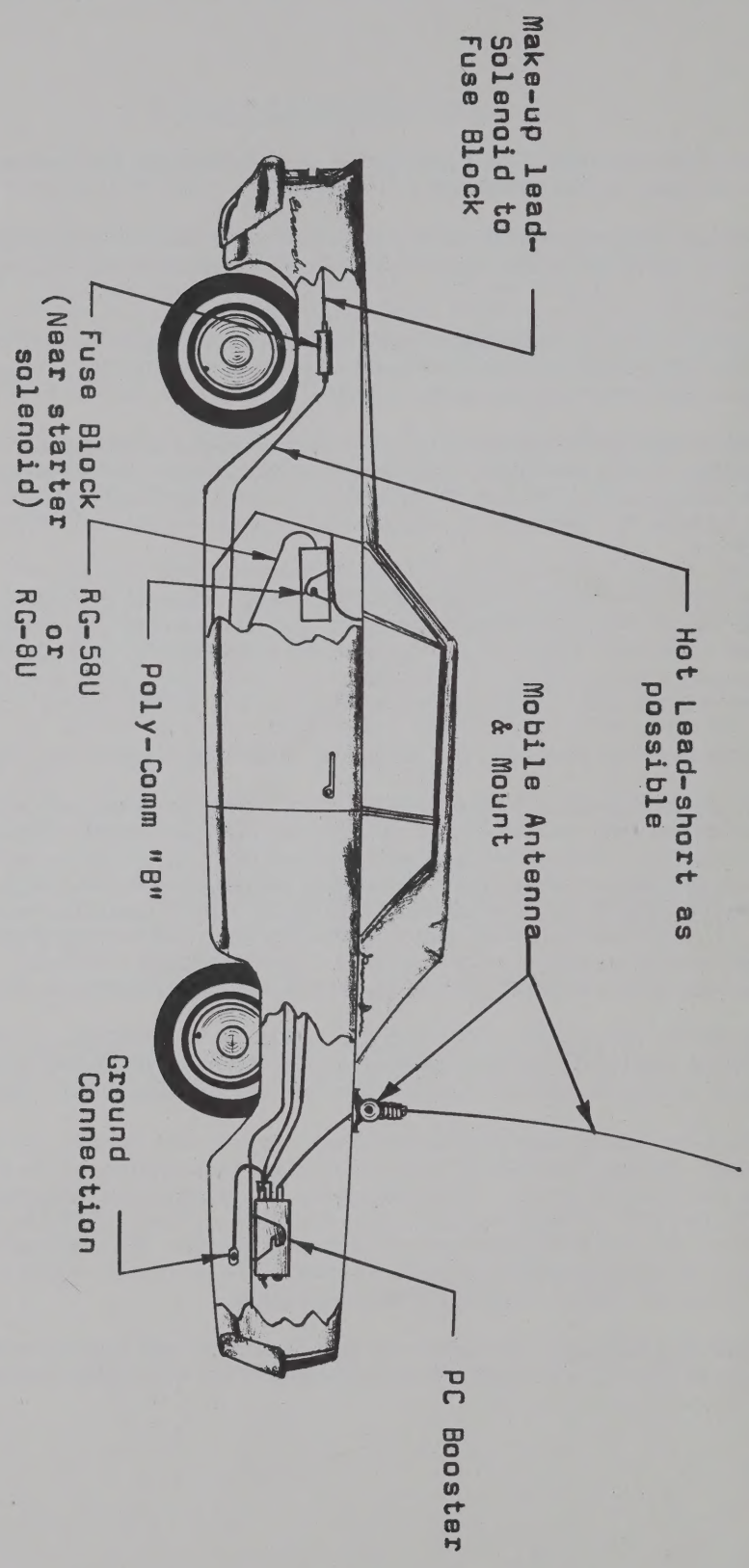


Figure 2. Typical Mobile Installation

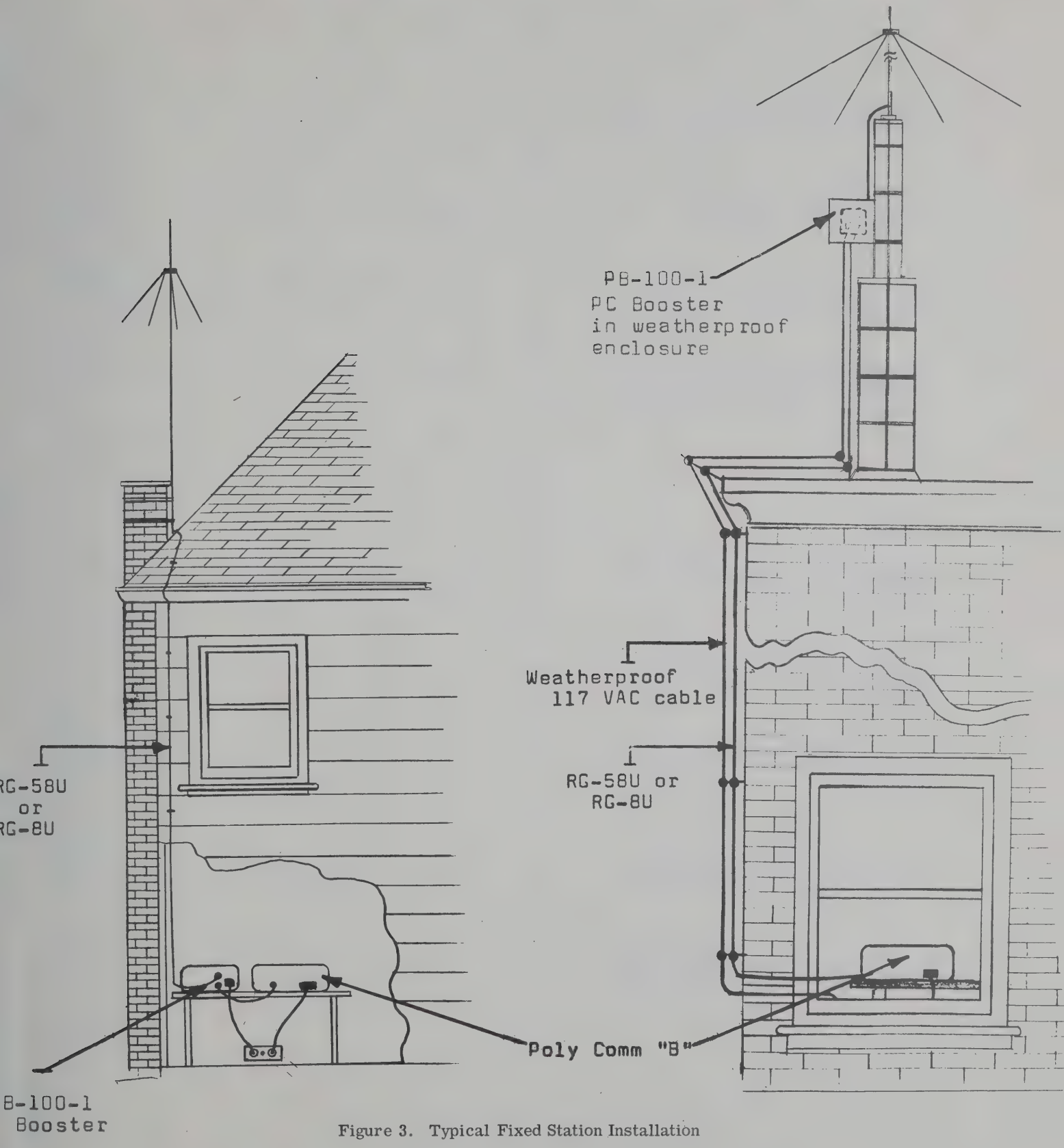
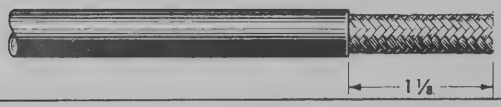
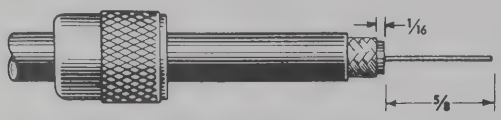
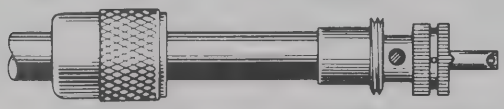
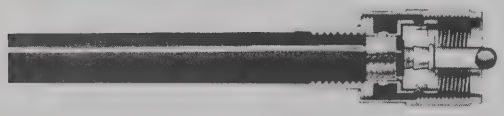


Figure 3. Typical Fixed Station Installation

RG8/U

	Cut end of cable even. Remove vinyl jacket 1⅛".
	Bare ⅝" of center conductor. Trim braided shield. Slide coupling ring on cable. Tin exposed center conductor and braid.
	Screw the plug sub-assembly on cable. Solder assembly to braid through solder holes. Use enough heat to create bond of braid to shell. Solder center conductor to contact.
	For final assembly, screw coupling ring on plug sub-assembly.

RG58/U

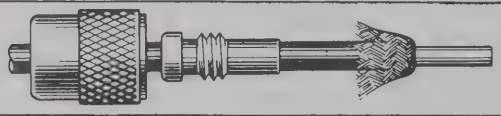
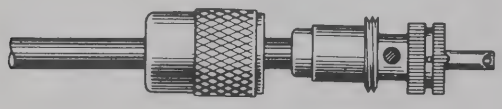
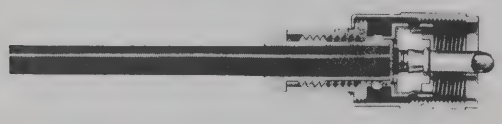
	Cut end of cable even. Remove vinyl jacket ¾". Slide coupling ring and adapter on cable.
	Fan braid slightly and fold back as shown.
	Position adapter to dimension shown. Press braid down over body of adapter and trim to ⅜". Bare ⅝" of conductor. Tin exposed center conductor.
	Screw plug sub-assembly on adapter. Solder braid to shell through solder holes. Use enough heat to create bond of braid to shell. Solder conductor to contact.
	For final assembly, screw coupling ring on plug sub-assembly.

Figure 4. Coax Plug Wiring Illustration

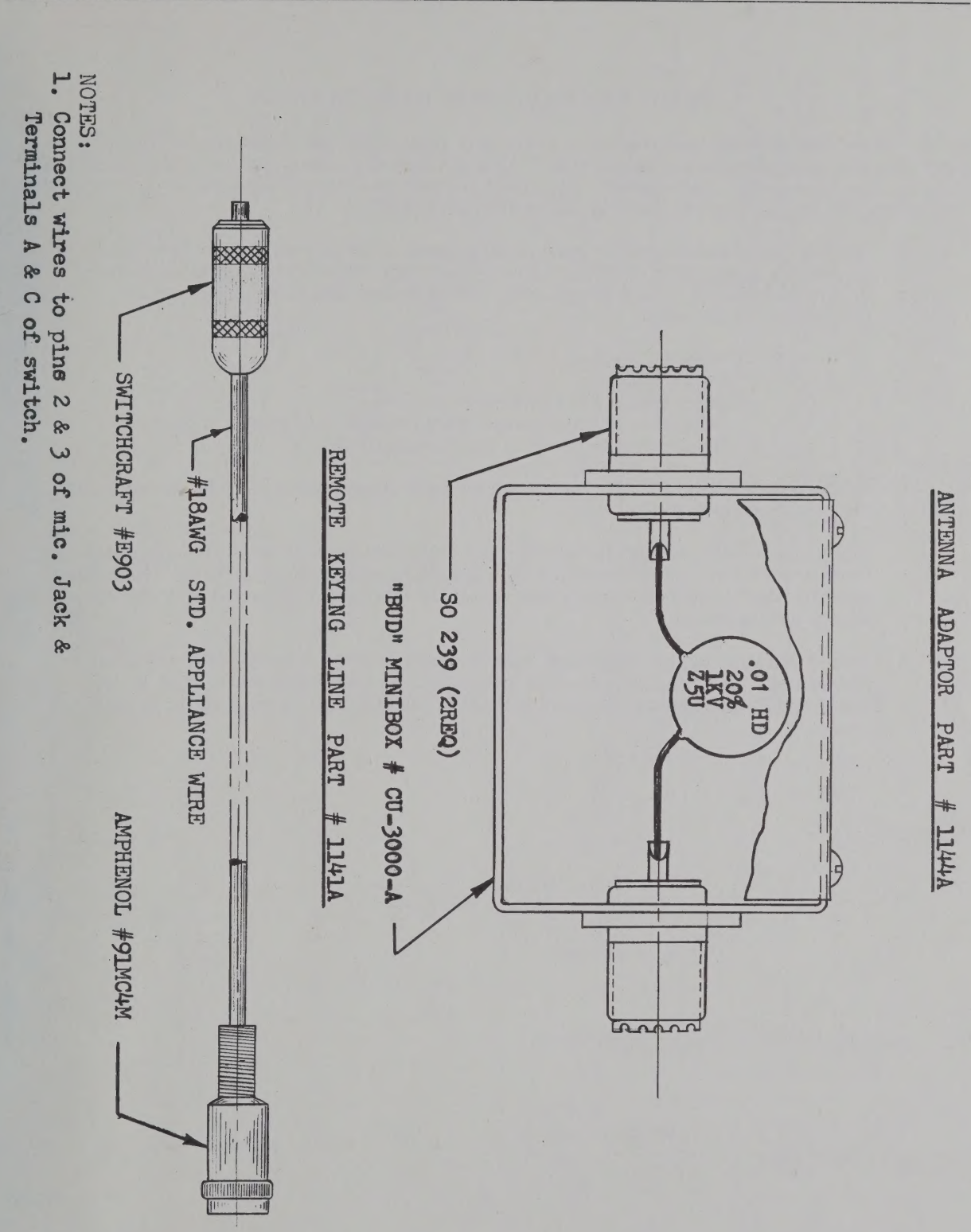


Figure 5. Antenna Adaptor and Remote Keying Line

SOME GENERAL FCC REGULATIONS

These rule sections are intended to serve as a guide only, and should not be construed as exact reproductions of pertinent' paragraphs. Although they are representative of the current regulations, the Polytronics Laboratories, Inc., does not guarantee their continuing accuracy, as the FCC Rules and Regulations are changed and revised periodically.

1. The current authorization for each mobile station shall be retained but need not be posted. A transmitter Identifications Card (FCC Form 452-C) must, however, be attached to each mobile transmitter. The licensee will enter the following information on the card:

   Name of licensee
   Station call sign
   Exact location of transmitter records
   Frequency or frequencies of transmitter operation
   Signature of licensee or his designated official

2. The current authorization for each base (or controlling station shall be posted at the principal control point.)

3. The licensee may use, at his discretion, a substitute plate of metal in place of the Identification Card (FCC Form 452-C). The plate will be entitled "Radio Transmitter Identification", and shall clearly display all the information required by Form 452-C except the signature.

4. Mobile and base station equipment must be checked at the time of initial installation, and annually thereafter by a service technician who is the holder of a valid 1st or 2nd Class Radiotelephone Operator's License, and the results entered in the station record.

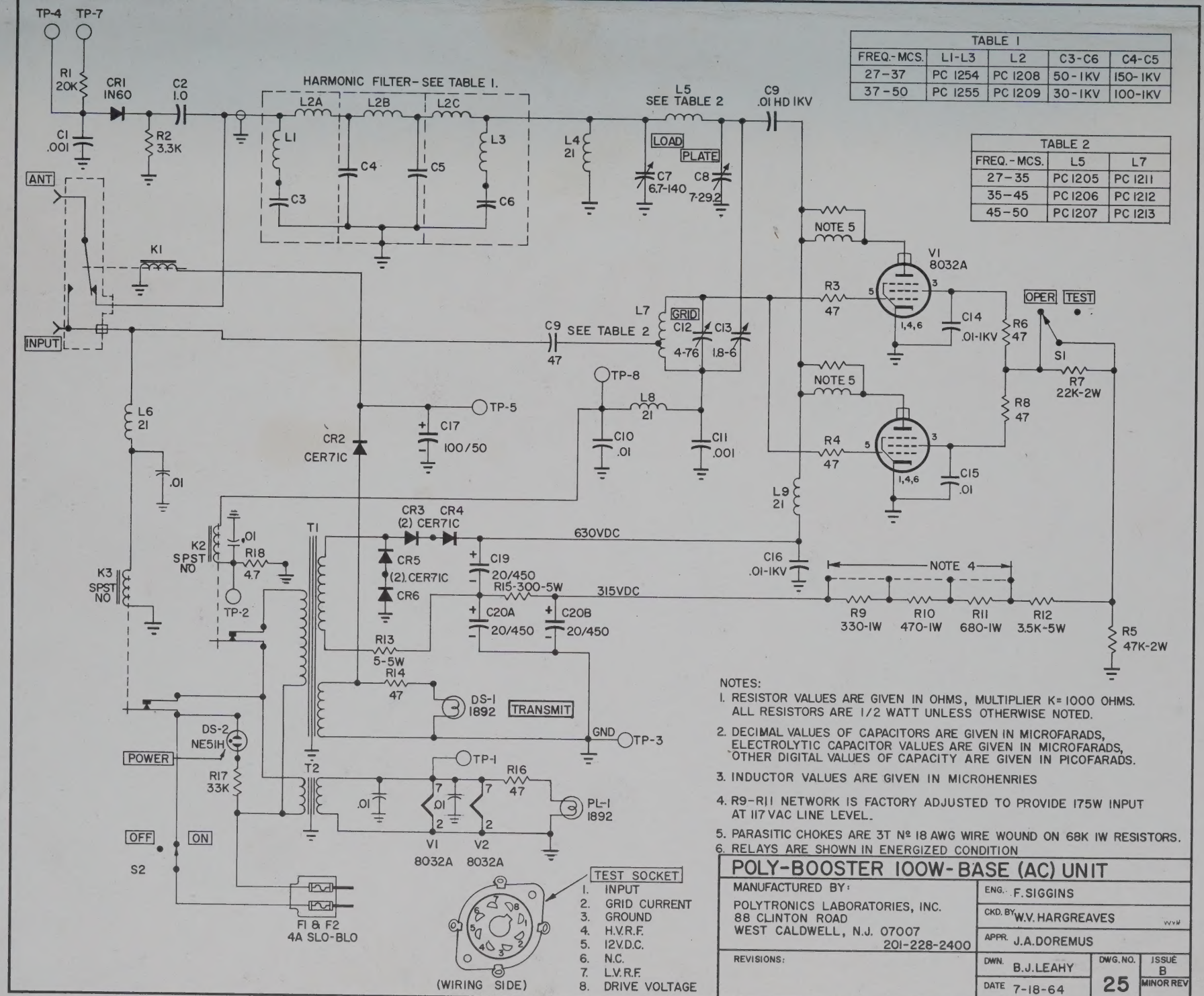


TABLE 1				
FREQ.-MCS.	L1-L3	L2	C3-C6	C4-C5
27-37	PC 1254	PC 1208	50-1KV	150-1KV
37-50	PC 1255	PC 1209	30-1KV	100-1KV

TABLE 2		
FREQ.-MCS.	L5	L7
27-35	PC 1205	PC 1211
35-45	PC 1206	PC 1212
45-50	PC 1207	PC 1213

NOTES:

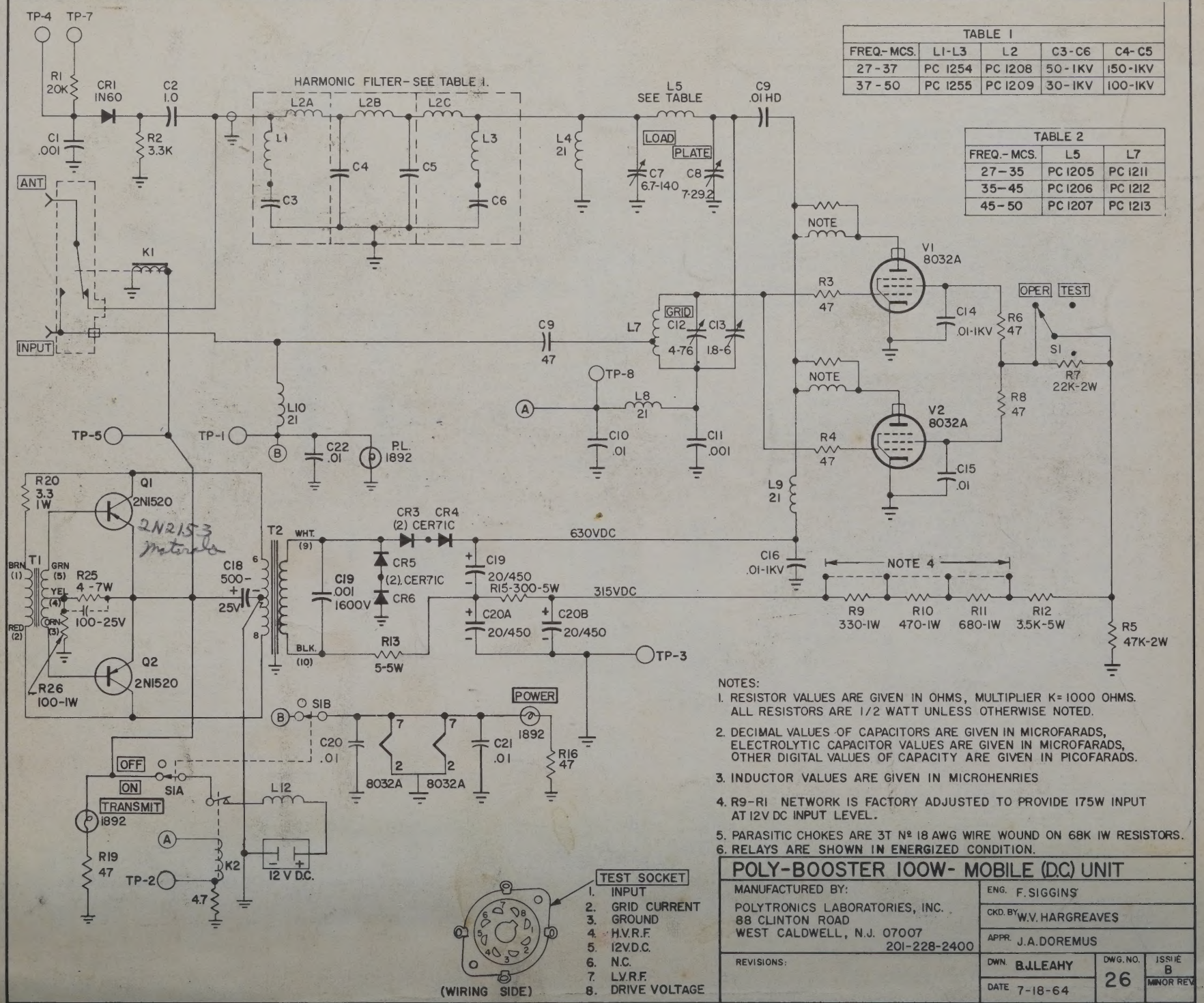
1. RESISTOR VALUES ARE GIVEN IN OHMS, MULTIPLIER K= 1000 OHMS. ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE NOTED.
2. DECIMAL VALUES OF CAPACITORS ARE GIVEN IN MICROFARADS, ELECTROLYTIC CAPACITOR VALUES ARE GIVEN IN MICROFARADS, OTHER DIGITAL VALUES OF CAPACITY ARE GIVEN IN PICOFARADS.
3. INDUCTOR VALUES ARE GIVEN IN MICROHENRIES
4. R9-R11 NETWORK IS FACTORY ADJUSTED TO PROVIDE 175W INPUT AT 117 VAC LINE LEVEL.
5. PARASITIC CHOKES ARE 3T Nº 18 AWG WIRE WOUND ON 68K 1W RESISTORS.
6. RELAYS ARE SHOWN IN ENERGIZED CONDITION

POLY-BOOSTER 100W-BASE (AC) UNIT

MANUFACTURED BY:
POLYTRONICS LABORATORIES, INC.
88 CLINTON ROAD
WEST CALDWELL, N.J. 07007
201-228-2400

REVISIONS:

ENG.	F. SIGGINS
CKD. BY	W.V. HARGREAVES
APPR.	J.A. DOREMUS
DWN.	B.J. LEAHY
DATE	7-18-64
DWG. NO.	25
ISSUE	B
MINOR REV	



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3. INDUCTOR VALUES ARE GIVEN IN MICROHENRIES
4. R9-R1 NETWORK IS FACTORY ADJUSTED TO PROVIDE 175W INPUT AT 12V DC INPUT LEVEL.
5. PARASITIC CHOKES ARE 3T Nº 18 AWG WIRE WOUND ON 68K 1W RESISTORS.
6. RELAYS ARE SHOWN IN ENERGIZED CONDITION.

POLY-BOOSTER 100W- MOBILE (D.C) UNIT

MANUFACTURED BY:
POLYTRONICS LABORATORIES, INC.
88 CLINTON ROAD
WEST CALDWELL, N.J. 07007
201-228-2400

ENG. F. SIGGINS
CKD. BY W.V. HARGREAVES
APPR. J.A. DOREMUS
DWN. B.J. LEAHY
DATE 7-18-64
REVISIONS:
DWG. NO. 26
ISSUE B
MINOR REV